

### **REMARKS**

Applicant has studied the Office Action dated December 23, 2008, and has made amendments to the claims. In particular, claim 11 was amended and independent claim 23 is added. It is submitted that the application, as amended, is in condition for allowance.

Reconsideration and allowance of the pending claims in view of the above amendments and the following remarks are respectfully requested.

In the Office Action, the Examiner:

- Rejected claims 3, 4, 9, 10, 11, 13, 14, 18, 20 and 22 under 35 U.S.C §103(a) as being unpatentable over Miller (US Patent No. 5,796,340) in view of Fraden (US 4,509,527).
- Rejected claims 2 and 12 under 35 U.S.C §103(a) as being unpatentable over Fraden in view of Miller in view of Sackner (US 2002/0032386).
- Rejected claims 6 under 35 U.S.C §103(a) as being unpatentable over Fraden in view of Miller in view of Cornish (US 2006/0247543).
- Rejected claims 5, 7, 8, 15, 17 and 19 under 35 U.S.C §103(a) as being unpatentable over Fraden in view of Miller in view of Porges (US 4,510,944).
- Rejected claims 8 and 19 under 35 U.S.C §103(a) as being unpatentable over Fraden in view of Miller in view of Sackner in view of Porges.
- Rejected claim 16 under 35 U.S.C §103(a) as being unpatentable over Fraden in view of Miller in view of Sackner in view of Cornish.
- Rejected claim 21 under 35 U.S.C §103(a) as being unpatentable over Fraden in view of Miller in view of Bridger (US 6,491,647).

### **I. Status Summary**

Claim 11 was amended to replace "an electronic mechanism for calculating" with "an electronic mechanism that calculates".

Claim 23 was added to specifically claim one embodiment.

No new matter has been introduced by the new claims in the present amendment. Reconsideration of the application as amended and based on the arguments set forth herein below is respectfully requested.

III. Claim Rejection under 35 U.S.C. §103(a)

**Claims 4 and 14 are patentable over the cited art**

Claims 4 and 14 stand rejected as being unpatentable under U.S.C. 103(a) over Miller (US 5,796,340) in view of Fraden (US 4,509,527). The Applicant respectfully traverses.

Claim 4 recites the following feature: "calculating a sum signal comprising a sum of the two vertical pressure signals and filtering and analyzing the calculated sum signal in combination with the horizontal pressure signal".

In rejecting claims 4 and 14 the Office Action states that this feature is inherently disclosed by Miller, Column 5, lines 26-30 (paragraph bridging pages 3 and 4 of the Office Action).

The applicant respectfully traverses, and submits that this statement is incorrect.

The cited lines in Miller read as follows:

"Although a variety of sophisticated signal processing techniques could be applied to the signal, for example, to determine the pulse and respiration rates, a much simpler procedure might be more suitable for home monitoring".

The Examiner is kindly reminded that "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (**emphasis in original**), recited in MPEP 2112 IV, second full paragraph.

The Office Action does not provide any basis, neither in fact nor in technical reasoning to support the determination that the aforementioned feature *necessarily* flows from the cited teaching. The theory of inherency is presented in the Office Action in a completely conclusory manner.

Even if for this reason alone, the Office Action does not set forth a *prima facie* case of obviousness against claims 4 and 14.

Moreover, the applicant respectfully submits that the reference negates any attempt to read into it any inherent teaching. By stating that "a variety of sophisticated signal processing techniques could be applied" the reference teaches that many different techniques could be applied, and none of them (including that recited in the rejected claims) is *necessarily* applied.

Thus, the applicants respectfully submit that the aforementioned limitation is NOT inherent to the cited references, and this is another reason for the failure of the Office to set forth a *prima facie* case of obviousness against claims 4 and 14.

**Claims 9 and 18 are patentable over the cited art**

Claims 9 and 18 are rejected as being unpatentable under U.S.C. 103(a) over Miller (US 5,796,340) in view of Fraden (US 4,509,527). The Applicant respectfully traverses.

Claim 9 recites the following feature: "at least one sensor is located beneath the lower part of the subject's body and at least one sensor is located beneath the upper part of the subject's body".

In rejecting claims 9 and 18 the Office Action states that this feature is disclosed by Fraden, Column 3, line 65 to Column 4 line 2 (page 4 of the Office Action).

The applicant respectfully traverses.

The cited lines read as follows:

"The transducer is adapted for placement between a patient and a patient support, such as a mattress, for sensing changes in the mechanical forces caused by the patient's cardiac and respiratory activity and may be used as an integral part of an apnea detecting system."

The Applicant respectfully submits that this passage does not teach or suggest the aforementioned feature. In fact, the cited passage discusses a single transducer, and is completely silent regarding placing one sensor in one location and another sensor in another location.

At least for this reason, the Office Action does not set forth a *prima facie* case of obviousness against claims 9 and 19.

**Independent Claim 22 is patentable over the cited art**

Claim 22 is rejected as being unpatentable under U.S.C. 103(a) over Miller (US 5,796,340) in view of Fraden (US 4,509,527). The Applicant respectfully traverses.

The applicants respectfully submit that the Office Actions does not set forth a *prima facie* case of obviousness against claim 22 at least for the following three reasons:

- (1) At least one of the claim limitations was not considered;
- (2) At least one of the claim limitations is not disclosed by any of the cited references, and the Office does not provide any rational for importing this limitation into the combined teachings of the cited references; and
- (3) The rational provided by the Office for combining the teachings of the two references is invalid.

**(1) A claim limitation was not considered**

Claim 22 contains a feature of “*subtracting* the first vertical pressure signal from the second vertical pressure signal” (emphasis not in the original). The applicant respectfully submits that this feature was not considered by the Office. Even if for this reason alone the Office Action does not set forth a *prima facie* case of obviousness (see MPEP 2143.03, stating that for making a *prima facie* case of obviousness “all claim limitations must be considered”).

The Office Action states that “Fraden teaches *creating* a horizontal signal” (Page 3 of the Office Action, emphasis not in the original), but does not consider the aforementioned feature, which explicitly recites “subtracting”.

**(2) Claim limitations are not disclosed by any of the references.**

Claim 22 contains a feature of “subtracting the first vertical pressure signal from the second vertical pressure signal”. The Applicant respectfully submits that

neither Miller nor Fraden discloses the aforementioned feature. Even if only for this reason, the Office Action does not set forth a *prima facie* case of obviousness.

Claim 22 further contains the following feature: "analyzing the horizontal signal for extracting the subject's heartbeat rate". The Office Action states that Fraden teaches this feature, and refers the applicant to col. 5 line 63 - col. 6 line 3 of the reference (page 3 of the Office Action).

The applicant respectfully submits that this statement is in error.

It is specifically disclosed in column 5 line 67 to column 6 line 3 that:

"the electrode configuration shown in  
FIG. 5 is also capable of detecting  
horizontal translation of the centre of  
gravity due to respiratory activity as well  
as substantially ***vertical displacement  
due to cardiac activity***".

Thus, Fraden attributes ***vertical*** displacement, and not a ***horizontal*** signal, to cardiac activity. ***Horizontal*** translation of the centre of gravity is attributed by Fraden to ***respiratory*** activity, and not to heartbeat. Table I below summarizes the differences between the claim and the reference

**Table I**

	HORIZONTAL	VERTICAL
Fraden reference	Respiratory activity	Cardiac activity
Claim	Heartbeat rate	-

Miller does not disclose and is not cited to disclose the aforementioned feature. Thus, the references do not teach all the features of claim. Even if for this reason alone, the Office Action does not set forth a *prima facie* case of obviousness.

**The Office does not offer a valid rational for combining the references**

The Office Action states that "a person of ordinary skill in the art, upon reading the reference, would have recognized the desirability of creating a horizontal signal exhibiting horizontal mass movements to enable extraction of the subjects heartbeat rate" (Page 3 of the Office Action).

The applicant respectfully submits that this statement is unbiased, regardless of the reference to which it relates.

Miller teaches that extraction of the subject's heartbeat is *not* desirable, at least under some circumstances (see Miller column 5, lines 26-30: "Although a variety of sophisticated signal processing techniques could be applied to the signal, for example, to determine the pulse and respiration rates, *a much simpler procedure might be more suitable* for home monitoring", emphasis not in the original).

Fraden describes an embodiment that allows "detecting horizontal translation of the center of gravity due to respiratory activity *as well as* substantially vertical displacement due to cardiac activity" (see column 5 line 67 to column 6 line 3), but does not even suggest that this ability allows extraction of a patient heartbeat rate. All it teaches is the ability to detect both movements originating in respiratory activity and movements originating in cardiac activity. Separating motions due to cardiac activity from other sensed motions and extraction of heartbeat rate are not mentioned by Fraden.

Thus, the applicants respectfully submit that contrary to the Office statement, a person of ordinary skill in the art, upon reading the references, would *not* have recognized any desirability of creating a horizontal signal exhibiting horizontal mass movements to enable extraction of the subjects heartbeat rate.

Furthermore it is noted that none of the references relate a horizontal signal to the subject heartbeat rate, as alleged by the Office (see table I above). The applicants respectfully submit that the statement that a skilled person reading the references would recognize the desirability of a feature not discussed in the references is not reasoned, conclusory, and incorrect.

Last, the Office Action states that "it would have been obvious...to modify Miller... to enable a passive means by which a patient's heartbeat rate may be acquired" (Page 3 of the Office Action). However, Miller does not require modification to enable "passive means by which a patient's heartbeat rate may be

acquired". For example, in the discussion of Fig. 7 Miller explains how the results obtained with his system allow evaluating the heartbeat rate of a 7 months old baby (see col. 6 lines 6-9 in Miller).

Thus, the applicant respectfully submits that the Office Action does not provide any valid rational for combining the references. Even if only for this reason, the Office Action does not set forth a *prima facie* case of obviousness against claims 22.

**Independent Claim 11 is patentable over the cited art**

Claim 11 is rejected as being unpatentable under U.S.C. 103(a) over Miller (US 5,796,340) in view of Fraden (US 4,509,527). The Applicant respectfully traverses.

First, as shown above in the discussion of claim 22, the Office Action does not provide any valid rational for combining the teachings of the references. Even if only for this reason, the Office Action does not set forth a *prima facie* case of obviousness against claim 11.

The applicants respectfully submit that claim 11 is patentable over the cited art at least because not all the claim's limitations are disclosed by any of the cited references, and the Office does not provide any rational for importing the missing limitations into the combined teachings of the cited references.

**The feature "at last two pressure sensors"**

Claim 11 recites a system comprising "at least two pressure sensors".

The Office Action states that this feature is disclosed by Miller on column 3, lines 26 to 30 (Page 2 and Page 3 of the Office Action). The Applicant respectfully submits that these lines do not teach a system with ***at least*** two pressure sensors. The term "at least two" excludes systems with only one pressure sensor. Miller does not teach such exclusion.

The cited lines read as follows:

"This analysis of the forces on a resting or sleeping human applies to pressure sensors other than mattresses, such as sensors placed under or incorporated in the legs of a bed or crib".

This statement deals with the kind of sensors that may be used for the analysis Fraden provides, but it does not teach or suggest a system with *at least* two sensors.

Furthermore, the analysis provided by Fraden considers only one sensor, and does not make use of two sensors, and certainly does not suggest a system with *at least* two sensors.

Thus, the applicant respectfully submits that Miller does not teach or suggest the aforementioned feature; and that even for this reason alone, the Office Action does not set forth a *prima facie* case of obviousness against claim 11.

**The feature "by subtracting"**

In addition, Claim 11 contains the following feature: "an electronic mechanism that calculates at least one horizontal signal **by subtracting** at least one vertical signal from another vertical signal".

As may be evident from the above discussion of claim 22, the Office did not consider the "by subtracting" feature and none of the references teach it. The Office Action does state that "Fraden teaches *creating* a horizontal signal" (Page 3 of the Office Action, emphasis not in the original), but even if this was the case, this would not constitute a teaching or suggestion of the aforementioned feature, which explicitly recites "subtracting".

Thus, not all the limitations of claim 11 are disclosed in the cited references. The applicants respectfully submit that even if only for this reason, the references do not set forth a *prima facie* case of obviousness against claim 11.

**Claim 23 is patentable over the cited references**

Applicant respectfully submits that newly presented claim 23 patentably defines over the cited art at least because of the following features recited therein:

providing at least two pressure sensors underneath the lying subject;  
... subtracting the first signal from the second signal to yield a difference signal; and extracting the lying subject's heartbeat rate by analyzing the difference signal, and that one of the first and second pressure sensors is located beneath a lower part of the subject's body and the other of the first and second pressure sensors is located beneath an upper part of the lying subject's body.



The above discussion shows that each of these features on its own is sufficient to establish patentability, certainly so, all four together.

**The dependent claims are patentable over the cited art**

The patentability of dependent claims 4, 14, 9, and 18 was discussed above. All the other claims are patentable at least in virtue of being dependent, directly or indirectly, on a patentable independent claim.

**Conclusion**

In light of the above amendments and remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

Respectfully Submitted,

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